Perspectives

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Assessing approaches to climate-change-related policy formulation in British Columbia's forest sector: The case of the mountain pine beetle epidemic

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Abstract

A growing literature considers how the forest management community will have to adapt to future climate change impacts. Recently in this journal, Spittlehouse and Stewart presented a framework for planning adaptive actions to address forest-related climate change issues. This paper expands on that framework by discussing five policy process approaches that might be used to implement such actions. The *policy community approach* outlines the complex configuration of policy actors. The *policy network approach* examines the relationships between those actors on particular issues. The *advocacy coalition framework* attempts to measure policy change by taking into account the competing policy-oriented belief structures. *Agenda setting* considers how issues get the attention of politicians. The *punctuated equilibrium model* attempts to explain how rapid change in government policy direction can alternate with long periods of stability. The authors conclude that understanding the policy process and how recommended policy changes will be realized is as important as identifying issues and the need for change. Examples from the application of these frameworks to British Columbia's mountain pine beetle infestation are highlighted throughout the paper.

KEYWORDS: *British Columbia, climate change, forest management, mountain pine beetle epidemic, policy process frameworks.*

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Introduction

Spittlehouse and Stewart's article "Adaptation to Climate Change in Forest Management" that appeared in this journal in 2003 asked forest managers and policy-makers to "evaluate the long-term impacts of climate change [on forests] and determine what the [forest] community might do now and in the future to respond to this threat."[1] They proposed a four-step framework for climate change adaptation in forestry:

1. defining pertinent issues,
2. assessing vulnerability,
3. undertaking current adaptive actions, and
4. developing future adaptive actions.

They called for the use of a scientific approach to determine what should be done in responding to how climate change may affect a broad range of forest-related aspects—from genetics and regeneration, to fire and insect protection, siliviculture work, non-timber resources, and park and wilderness areas. Public policies, they argued, should be developed to encourage (or, at the very least, not discourage) adaptation to long-term climate change in all of these aspects.

But how should recommended adaptive actions actually be formulated, formalized, and finally implemented into public policy? In this paper we expand the discussion from where Spittlehouse and Stewart left off.

With the needs and interests of forest policy-makers, researchers, and the operational community in mind, the objectives of this paper are to:

- introduce five popular policy process frameworks;
- broaden Spittlehouse and Stewart's adaptation framework by integrating policy process frameworks; and
- suggest how these frameworks could be used to understand current and potential responses to one of the most pressing climate-change-related issues in British Columbia's forest sector today: the mountain pine beetle epidemic.

Background

A chronic shortcoming of the literature on adaptation to climate change is its neglect of the policy/political process frameworks (see, for example: Scheider 1997; Smit *et al.* 2000; Toth 2003; Linder *et al.* 2002). While Spittlehouse and Stewart do recognize that political (as well as ecological, social, and economic) systems will require adjustment, even they do not outline what those necessary adjustments might be. Arguments based on the best available science have been made for a variety of prescriptive policy suggestions, but very little discussion has followed about whether or how such policies could ever be realized or implemented.

The mountain pine beetle epidemic in British Columbia's southern interior offers an excellent example of a climate-change-related issue that demands short- and long-term policy responses.

Part of the problem is the gap that often exists between science-based solutions and their practicality in light of competing organizational interests and political pressures within a democratic system. This can lead, on the one hand, to frustrations at the field level where personnel can feel that the most rational and effective policies or programs are not being adopted; and, on the other hand, to concern at the strategic or political level that technically oriented solutions are too simplistic.

The mountain pine beetle epidemic in British Columbia's southern interior offers an excellent example of a climate-change-related issue that demands short- and long-term policy responses (see sidebar, page 3). The short-term policy responses by both levels of government are well known (including, notably, the provincial Mountain Pine Beetle Emergency Task Force and the federal government's $40 million Mountain Pine Beetle Initiative). It is too soon to tell, however, what the long-term policy responses will be.

This paper's assessment of various theoretical approaches to policy-making will, it is hoped, promote better decisions by operational managers and decision-makers in the long term. The tools and techniques presented here for understanding the policy process will therefore assist those who must make policy decisions (and those who are affected by such decisions) understand and respond to the challenges and complexities associated with the mountain pine beetle.

[1] The "forest community" refers to those individuals and organizations engaged in forest-related activities.

The Mountain Pine Beetle Epidemic

The mountain pine beetle (*Dendroctonus ponderosae*) thrives on mature lodgepole pine (*Pinus contorta* var. *latifolia*). Since 1994, British Columbia's interior region (particularly the Morice Lakes, Vanderhoof, and Quesnel forest districts) has experienced a number of mild winters. As a result, beetle larvae morality has decreased from 80% to less than 10%—leading to an explosion in the beetle population. Climate data for the region indicates that the average annual temperature has increased by 2.2–2.6°C over the past 100 years, and climate models project that this warming trend will continue (British Columbia Ministry of Water, Land and Air Protection 2002).

The area's abundance of mature lodgepole pine makes it an ideal environment for large beetle colonies. In 2003, an estimated 4.2 million ha—covered by 160 million m^3 of timber—were attacked. This epidemic has spread at an alarming rate, affecting from about 160 000 ha in 1999 to 8.7 million ha in 2005 (B.C. Ministry of Forests 2003; B.C. Ministry of Forests and Range 2006).

The response by both levels of government and the forest industry has been swift. In 1999, the Mountain Pine Beetle Emergency Task Force was formed to manage the infestation's impact. Based on the work of the Task Force, the Mountain Pine Beetle Action Plan was announced in November 2001 with the provincial government committing more than $100 million in emergency funding to support affected forestry communities and co-ordinate common strategies to address the crisis. The federal government followed suit with a 5-year $40 million Mountain Pine Beetle Initiative that was aimed at studying the impacts as well as developing management approaches to combat further outbreaks.

Five Frameworks for Understanding Policy Process

The five approaches to the policy process discussed here include the:

- policy community framework,
- policy network framework,
- advocacy coalition framework,
- agenda-setting model, and
- punctuated equilibrium model.

The relevance of each of these frameworks to the policy, research, and operational communities is assessed within the context of both a generalized climate change issue and the more specific mountain pine beetle epidemic issue.

Policy Community and Policy Network Frameworks

Government agencies no longer have the capacity or the resources to address issues single-handedly (Smith 2000; Lindquist and Wellstead 2001). They depend now on the co-operation and resources of other "actors," governmental and non-governmental. The responses to the mountain pine beetle epidemic at both levels of government (noted above) illustrate well this trend of increased interaction between government agencies and societal-based organizations (e.g., NGOs, academia, communities, forestry industry) to address such key issues.

In Canada, both the *policy community* and *policy network* frameworks carry considerable currency as research approaches (Howlett and Ramesh 2003). According to Atkinson and Coleman (1995), the policy community and policy network approaches refer to the actors (organizations and individuals) within a particular sector and their relationships with one another. This approach is different from the classic (and somewhat simplistic) view of a policy process that is focussed on the relationships between elected officials and lobby groups. Although elected officials do have an important role in the policy process, the growing technical complexity of many issues requires the participation of a wider range of policy actors.

Policy Community Framework

Coleman and Skogstad (1990) state that policy community members share a common policy focus and, with varying degrees of influence, shape policy outcomes over the long run. The policy community is divided into two segments:

- The "sub-government segment," at the centre of any policy community, includes those senior government personnel who are in positions of direct responsibility for a particular policy sector and, in

other cases, organizations that have become established and engaged day-to-day participants in policy formulation and implementation. Sub-government actors attempt to maintain what Baumgartner and Jones (1993) refer to as a "policy monopoly." Policy monopolies typically have two major characteristics: (1) a definable institutional structure that limits access to the policy process; and (2) the supporting ideas associated with the institutions that connect to core policy values. Policy monopolies are successful when they are driven by a powerful idea and are able to function without need for much access to others outside the sub-government (Baumgartner and Jones 1993).

- The "attentive public segment" includes those actors who are capable of influencing policy, but who do not participate in policy-making on a regular basis (e.g., interest groups, professional organizations, other government departments, international organizations).

British Columbia's forest policy community is one of the largest and most diverse in Canada (see Cashore *et al.* 2000). Its sub-government segment is the B.C. Ministry of Forests and Range, which is responsible for the day-to-day formulation of British Columbia's forest policies. Its attentive public segment includes countless actors, ranging from environmental groups, universities, consultants, labour organizations, communities, and forest industry companies to First Nations' governments and federal government departments such as Environment Canada and Natural Resources Canada. Attempts by British Columbia's attentive public to the break the Ministry of Forests' policy monopoly are well known (Cashore *et al.* 2000; Hoberg 2000). However, in the case of climate change, the intersection of several policy communities is expected, as well as a subsequent influx of other policy actors not normally associated with the forest policy community. This may include, for example, a more significant role for the Ministry of Environment and climate-change research organizations.

Policy Network Framework

While policy communities define all of the actors involved in particular sector's policy process, the policy network describes the types of relationships between governmental and non-governmental actors that evolve in a particular issue (Lindquist 1992). A large body of literature on the policy network framework describes relationships that depend on factors such as resources (e.g., funds, number of personnel), degree of institutionalization, and rules of conduct (Coleman and Skogstad 1990; Lindquist 1992; van Waarden 1992; Howlett and Rayner 1995). Coleman and Skogstad (1990) examined Canadian policy communities, including agriculture, forestry, wilderness, and banking. They classified policy networks into three types according to government and societal powers and organizational capacity:

- A *pluralist policy network* exists when there are many actors involved. These networks may occur when power is dispersed from either government or society (pressure pluralism), when societal actors are disorganized (clientele pluralism), or when organized interests are dominant (parentaela pluralism).
- In a *closed policy network*, policy-making is concentrated within a government agency and one societal organization (a concentration) or a government agency and two or more societal organizations (corporatist).
- A *state-directed (closed) policy network* includes highly autonomous co-ordinated government agencies that dominate the policy-making process.

Howlett and Rayner (1995) argue that Canadian forest policy networks—and particularly British Columbia's forest policy community—have historically been closed and highly resistant to policy change. The emergence of forest-based climate change issues, however, may attract a unique line-up of traditional *and* new actors, leading to new policy network configurations. The new policy actors will likely bring with them not only ideas and strategies to address climate change issues, but also greater capacity and resources for doing so. On the other hand, there is a risk that climate-change-related issues could get lost among the host of other pressing issues competing for government's attention. In our view, the "mountain pine beetle epidemic policy network" has been from the outset—like many other forest policy networks in the province—a tightly knit collaborative effort between a select few traditional forest policy actors. To facilitate adaptation at the policy level, this closed network may need to shift to a more pluralist network, integrating efforts with other actors interested in and affected by the mountain pine beetle.

Advocacy Coalition Framework

Policy communities and their associated networks describe the structural features of the policy-making process. The advocacy coalition framework describes policy change as it occurs as a result of shifting policy-oriented beliefs and policy learning (see sidebar, page 5). This framework, developed by Sabatier and Jenkins-Smith (1993, 1999), enables the examination of policy change

Four Main Premises

The advocacy coalition framework has four main premises:

1. Events external to the policy community (e.g., change in government) influence major policy shifts and often constrain the actions of its actors.
2. Measuring the impacts of policy change and policy learning requires a time perspective of a decade or more.
3. Policy change is best understood through the examination of a policy community as the unit of analysis.
4. Within the framework's boundaries are usually 20–30 organizations (policy actors) that are defined by their policy belief structures. These organizations are reflected by two to four key competing coalitions.

within a policy community. Sabatier and Jenkins-Smith (1999) argue that the policy process is not simply the result of "competition among various interests in which financial resources and institutional rules are dominant," but is also shaped by policy-oriented beliefs and policy learning.

Coalitions seek to translate their beliefs into public policies and programs. A shared belief system can be arranged according to three distinctive categories:

- The deep *normative core* is equated with the deep-rooted personality of an individual and is nearly impossible to change.
- The *policy core* is the basic strategy and policy position of a coalition. For example, Wellstead's (1996) study of Alberta and Ontario's forest policy communities found that the tenure system defined the policy core belief structure of the dominant provincial government/industry advocacy coalitions within both provinces. Recently, Bourgeois (2003) proposed that the long-term changes to British Columbia's forest management hinged on changes to its tenure system. Change to policy core beliefs is possible but difficult. The differences between competing coalitions' core beliefs are what capture media attention. However, policy change can also come about with debate over "secondary aspects" (see next point).
- *Secondary aspects* are the instrumental decisions that are necessary to implement the policy core. It is at this level that most policy changes occur within a sector, since it is not as threatening to the competing coalitions' core policy belief. As a result, actors from different coalitions are willing to compromise on secondary aspects more readily. A statutory revision such as changing the size of a forest buffer zone is an example of a change to a secondary aspect.

Policy learning, another major aspect of the advocacy coalition framework, is defined as relatively enduring alterations of thought or behaviour that result from experience and are concerned with attaining or revising the precepts of one's belief system (Sabatier and Jenkins-Smith 1993). Such learning can occur within a coalition and among competing coalitions—and it is most typically the latter when there is an intermediate level of informed conflict between the two. Furthermore, Sabatier and Jenkins-Smith (1999) hypothesize that such debates occur more so on secondary aspects of the policy belief systems than on core beliefs. Policy learning is facilitated when coalitional members have the technical resources to engage in such a debate in a forum dominated by professional norms (e.g., conferences, peer-reviewed journals). In forums like these, challenges can be made to the validity of data concerning the seriousness of the problem and the required institutional arrangements that will provide the necessary changes in behaviour.

All of Spittlehouse and Stewart's (2003) proposed actions for adaptation in forestry relate to secondary aspects of policy-oriented belief systems, because they are operational in nature and do not pose a threat to dominant policy core beliefs. However, if the core forest policy belief system in British Columbia was to change substantively and the dominant forestry coalition to change as well, these proposed adaptive actions might have to be revisited.

The availability of scientific forums in which to debate climate change issues and enhance policy learning is another factor that can affect the secondary aspects of a belief system. In the case of the mountain pine beetle outbreak, the role of salvage logging as a management response has become a contentious issue, prompting considerable debate between environmental groups and the provincial government and forest industry. Environmental groups believe that salvage logging is an unnecessary prescription undertaken only to maximize economic returns. They also charge that such actions may actually "increase the probability of outbreaks of even greater intensity by creating even-aged stands of the host lodgepole pine" (David Suzuki Foundation

2005). The provincial government and forest industry argue that massive salvage logging is necessary to limit the spread of the infestation. Both sides in the debate have turned to scientific information and data to promote their argument—an example of active policy learning through informed conflict. Such productive debate should be encouraged and venues for science-based conclusions supported.

Agenda-setting and Punctuated Equilibrium Models

While many experts within the forest policy community recognize climate change as an important issue, this does not mean that it will be at the forefront of the government's policy agenda. The research that examines policy communities, policy networks, and advocacy coalitions provides little insight into how issues initially become part of the government agenda. One avenue of exploration, however, builds on work by Kingdon (1984) and Baumgartner and Jones (1993).

Agenda-setting Model

To explain the formation of public policy within the U.S. federal government, Kingdon (1984) defines three relatively independent streams of influence:

- The *problem stream* contains a variety of problems that need to be addressed. Their priority is fluid, determined by factors such as crises, symbolism, and issue visibility.
- The *policy stream* contains a wide range of ideas that have the potential to be solutions to problems in the problem stream. Proposals may be new, or they may linger for years until they appear to be appropriate.
- Events in the *political stream* occur independently of the other two streams. Personnel changes, constituent and interest group mood and opinion, and shifts in ideology all play a part in defining the political climate in which policy formation occurs. The political stream is the most critical avenue to placing an item on the agenda because politicians set the agenda.

Policy proposals become reality when there is a combining of at least two of streams—for example, the joining of a high priority agenda item from the problem stream with a solution from the policy stream, all at a time in the political stream when the climate is right for a change. Needed to facilitate this process is a policy entrepreneur: an individual who is willing to invest time, energy, reputation—and occasionally even money—in the hope of reaping some type of reward. A "policy window" (that is, an opportunity for action on an issue) is also necessary. It enables an issue to move from the institutional agenda where it has received serious attention, to the decision agenda where it has more active status and may be under review for a decision. Windows open briefly and infrequently, usually because of a change in the political stream.

British Columbia's mountain pine beetle epidemic is an example of a climate-change-related issue coming to the forefront of the government's agenda. There has been a long-standing scientific research effort relating to the infestation (the problem stream), and solutions have been offered to manage possible outbreaks. Only after the devastating impacts of the epidemic started being felt did the three streams of influence combine in government-led initiatives, starting in 1999 with the formation of the Mountain Pine Beetle Task Force.

Punctuated Equilibrium Model

The agenda-setting model examines how issues become part of the government agenda during stable periods. The punctuated equilibrium model, developed by Baumgartner and Jones (1993), attempts to explain why the policy process fluctuates between periods of stability and periods of dramatic and rapid change.

In most cases, policy-making follows an incremental path where, as noted above, policy monopolies dominate. During times of stability, shocks to the policy-making system are dampened by self-correcting mechanisms—what Baumgartner and Jones (2001) call negative feedback.

> *These are the mechanisms that induce stability and incrementalism in public policy, and they are fundamental to most models of bureaucratic behavior, the functioning of policy subsystems, concepts of interest-group pluralism, models of democratic gridlock, and to other prominent views of the policy process (*Baumgartner and Jones 2001:5).

A system based on negative feedback never allows the political system to veer too far from an underlying equilibrium. On the other hand, a system based on positive feedback encourages a rapidly changing, self-reinforcing process that accentuates rather than counterbalances a trend (Baumgartner and Jones 1993). In a case such as this, a policy monopoly loses support for its ideas while rival institutions and other policy actors appear and attempt to be involved. The mountain pine beetle epidemic may represent a positive feedback to British Columbia's forest policy community, allowing significant policy change to occur during the epidemic and resulting in a different policy-making environment afterwards.

The current and future adaptation actions proposed by Spittlehouse and Stewart (2003) suggest implicitly the need to work within the existing policy monopoly to address secondary aspects of the existing policy belief system (e.g., modifying seed transfer zones, maintaining and rehabilitating roads to reduce sedimentation). None of their proposals involve dramatic changes to the forest policy-making process. However, a clustering of catastrophic events—such as that brought on by the mountain pine beetle epidemic—may lead to more substantive policy changes that diverge from the accepted forest management practices.

Discussion and Conclusion

The breadth of government involvement in all facets of modern life, combined with the increasing complexity and specialization of policy-making, has necessitated new ways of approaching policy development. An analysis of policy process frameworks—such as the five introduced in this paper—should therefore encompass broad institutional and social contexts, embrace other disciplines besides just politics (e.g., economics, sociology), and, most importantly, be problem-oriented.

As shown by the frameworks outlined above, the formulation of significant policies to address the effects of climate change in British Columbia's forest policy community could, in the current closed environment, be problematic. However, the mountain pine beetle epidemic has illustrated that rapid policy change is actually possible. Unfortunately, significant policy change often occurs after the fact. This leaves little room for the process of policy learning between the value orientations of competing coalitions within British Columbia's forest sector—in other words, little room for scientific debate on existing secondary issues and on core policy beliefs, particularly those embedded within current tenure arrangements. Policy solutions will therefore have to reach beyond the realm of politicians, encompassing a wider constituency of policy actors that includes those in the field dealing day-to-day with the growing effects of climate change.

Table 1 summarizes the five policy frameworks described above and the challenges and opportunities they present for policy formulation around the mountain pine beetle epidemic.

TABLE 1. Overview of the policy process frameworks reviewed in this paper

Framework	Description	Applicability to the mountain pine beetle epidemic
Policy community framework	Identifies those policy actors (individuals and organizations, state and society) that are involved in the policy-making process within a particular sector.	New/different actors may be stepping up or should be invited to do so, creating both opportunities and challenges.
Policy network framework	Describes the relationships between state and society actors when they interact with each other on particular issues.	Relationships between traditional and new actors may shift, creating new opportunities (new perspectives, resources) and challenges (conflict, learning curves).
Advocacy coalition framework	Examines long-term policy change within a policy community that is determined by the belief structure of policy actors and is influenced by external shocks (elections, socio-economic trends) and policy learning between actors.	Current policy has been greatly shocked and challenged by the epidemic, but debate and learning offer constructive responses.
Agenda-setting model	Determines how some issues supersede other issues on the government's agenda.	Scientists and policy-makers need to get politicians' attention; decision makers need to be conscious of converging problem and policy streams.
Punctuated equilibrium model	Considers how there can be a significant change in policy-making after long periods of stability.	Promotes positive feedback to accelerate response, adaptation.

Policy solutions will have to reach beyond the realm of politicians, encompassing a wider constituency of policy actors that includes those dealing day-to-day with the growing effects of climate change.

The policy community and policy network frameworks reveal the structural features of the policy-making process: notably, the actors and relationships that exist among them on pertinent issues. Further research is needed to determine whether the network of policy actors dealing with climate change issues in British Columbia is different from the policy networks dealing with other key forest issues in the province.

The dynamics of policy change are reflected in policy-oriented beliefs of competing advocacy coalitions. It remains unclear whether the dominant advocacy coalition of British Columbia's forestry policy community could alter its core policy beliefs enough to enable the substantial change that will be required to address climate change impacts. To date, the scientific debate and prescriptive suggestions for adaptive measures to climate change have been focussed on the secondary aspects (the operational level) of the policy belief structure. As a result, there is a greater likelihood that they, rather than core policies, could change. Spittlehouse and Stewart (2003) have drawn attention to the growing vulnerability of British Columbia's forest sector to climate change. However, as far as we can tell, little related to the issue has yet come to the forefront of the provincial government's agenda. Only where all three streams in the agenda-setting process (the problem, policy, and political streams) have converged—as in the case of the mountain pine beetle epidemic—has short-term policy change been enacted and action taken.

Finally, the punctuated equilibrium model shows how the policy-making process can operate for many years in a stable environment and then undergo periods of instability and substantial revision. In British Columbia, this period of uncertainty and evolution could well emerge from within the forest policy community. As the relationship between climate change and events such as insect infestation and wildfire becomes better understood, the need for substantial policies to manage the long-term effects of climate change in the forest sector will also be recognized.

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Test Your Knowledge . . .

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How well can you recall some of the main messages in the preceding Perspectives paper? Test your knowledge by answering the following questions. Answers are at the bottom of the page.

1. The punctuated equilibrium framework is:
   A) an entomological-based model developed by the Canadian Forest Service that measures the impact of the mountain pine beetle epidemic.
   B) a policy framework that explains how significant policy change can occur after long periods of stability.
   C) an economic model that explains price elasticity for salvage timber.

2. According to the policy community literature, which of the following would be considered to be a policy actor?
   A) B.C. Ministry of Forests and Range
   B) Western Canada Wilderness Committee
   c) MacMillan Bloedel
   D) All the above

3. Historically, British Columbia's forest policy networks have been described as:
   A) chaotic
   B) closed and resistant to change
   C) highly pluralistic

ANSWERS

1. B 2. D 3. B